

## Technical Reference

### Application – Hands-Free Card Reading

#### Change History

Version	Date	Author	Comments
1.0	25 May 2011	L. Hickcox	First release.

*In some portal applications, the card users may not hold their cards by hand, and may not present the cards to the reader. The users may instead carry their cards in pouches clipped to clothing, or attached to a lanyard or clip-strap, or even in a wallet or bag. The cards may be used for physical access by people at doors and gates, and for time-and-attendance records. These notes propose solutions using AWID's products.*

AWID has two technology groups that may be useful in these applications for people at a doorway or gate or portal.

- (a) UHF products – **LR-2000** long-range reader family and cards.
- (b) LF proximity products – **MR-1824** medium-range reader family and cards.

An application with hands-free reading of cards carried by people at a portal has these characteristics:

- **RF field size:** The effective RF field for the **LR-2000** long-range reader, with its UHF tags and cards, is shown on page 2. If this reader were mounted on the wall above a portal, it could cover a space in front of the reader up to about 8 feet wide at the portal. The **MR-1824** proximity reader can read its proximity cards up to 24 inches from the face of the reader in a roughly spherical shape around the reader.
- **Directional output:** The **LR-2000** reader has a single large RF field that extends from the front surface of the reader (page 2). The **MR-1824** reader can read its cards anywhere around the reader, but its greatest read range is in front of the reader. All cards and tags have directional output to some degree. Best reading distance occurs when either flat surface of the card or tag faces and is parallel to the front of the reader.
- **Reading distance:** When a hand-held UHF card is presented to the **LR-2000** reader, reading distance is typically 15 feet. The maximum distance for a proximity card with the **MR-1824** reader is up to 2 feet.
- **Single code:** For both of these reader models, one card can be in the effective RF field at any time. This assures accurate reading for every card, without data collision. The first card must be removed from the field before a second card is brought into the field for reading.
- **Transmission blocking:** The **LR-2000** reader's 902-928 MHz UHF field may be blocked by material like clothing, a wallet, a handbag, other cards, a hand or body. The **MR-1824** reader's 125 kHz low-frequency field with proximity cards passes without reduction through the hand and common materials except metals.
- **Budget:** Either reader technology provides reasonable cost for this application. The proximity cards with the **MR-1824** reader are especially cost-effective.

Comparison: Either technology may be used, but neither is completely hands-free.

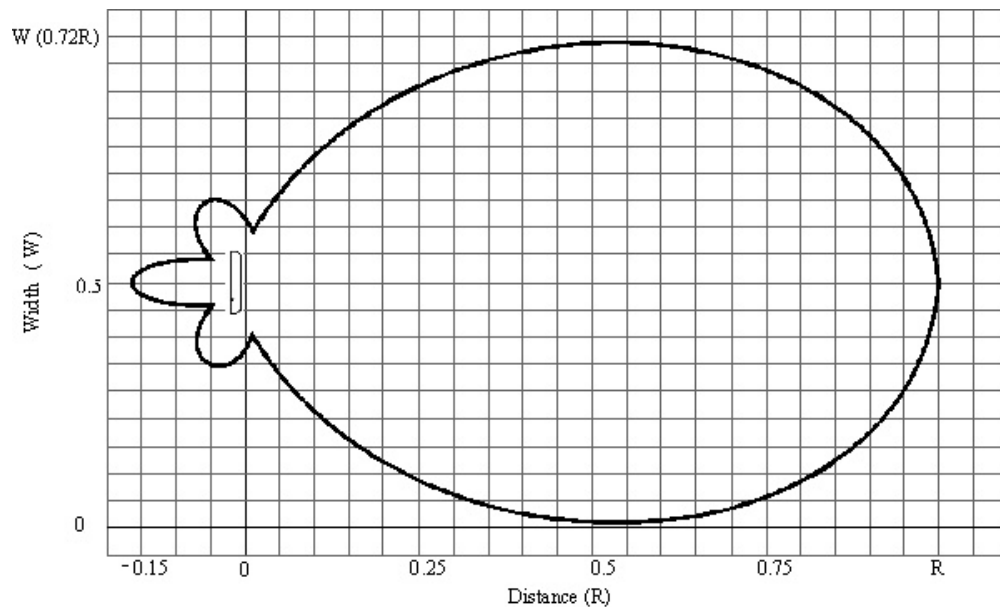
- (a) With the **LR-2000** reader above the portal, and with the UHF cards on lanyards, the users may hold the cards away from their bodies and clothing, and may aim either flat side of the card toward the face of the reader.
- (b) With the **MR-1824** reader, the proximity cards read through clothing and wallets, but the cards must be within 24 inches of the reader. Therefore the users may need to extend the cards into the reader's read range.

Conclusion: The choice of AWID's technologies rests on the ability to assure a clear line-of-sight between the **LR-2000** long-range reader and its cards, or the ability to present the proximity card within 2 feet of the **MR-1824** reader. In both technologies, the cards may need to be held parallel to the face of the reader.

**Special feature:** Both **LR-2000** and **MR-1824** readers have a "HiLo" version that can double the cross-section area of the effective RF field. (However, the maximum reading distance remains the same.) Contact AWID's sales representative or technical support for product sheets.

## LR-2000 Long-Range Reader

### Effective RF Field with UHF Credentials



**Figure 1. Effective RF field for tags with LR-2000 reader.**

- The effective RF field is a figure of rotation of this diagram about its horizontal “R” axis.
- Polarity of transmitted RF is circular.
- Distance “R” is the read range for each AWID UHF tag or card.
- Typical reading distance of 15 feet, depending upon the tag or card type, is less than “R”.
- Typical maximum field width “W”, at half of the read-range distance “R”, is about 0.7 of the read range.